

CLAIMS

1. An expandable prosthesis comprising:
- (a) a discontinuous wall defining a lumen adapted to assume a longitudinally contracted position and a longitudinally expanded position; and
- 5 (b) at least one layer of expanded polytetrafluoroethylene having a first average longitudinal inter-nodule distance in a free state, the layer of polytetrafluoroethylene affixed to the wall such that it has a second average longitudinal inter-nodule distance when the wall is in the longitudinally contracted position, the second average longitudinal inter-nodule distance being less than the
- 10 first average longitudinal inter-nodule distance.
2. The prosthesis of claim 1 wherein the layer of expanded polytetrafluoroethylene has (i) an average longitudinal inter-nodule distance of between about 0 and about 50 microns when the wall is in the longitudinally contracted position, and (ii) an average longitudinal inter-nodule distance of
- 15 between about 50 and about 150 microns when the wall is in the longitudinally expanded position.
3. The prosthesis of claim 2 wherein the layer of expanded polytetrafluoroethylene has (i) an average longitudinal inter-nodule distance when the wall is in the longitudinally contracted position of between about 5 and about 45
- 20 microns.
4. The prosthesis of claim 3 wherein the layer of expanded polytetrafluoroethylene has (i) an average longitudinal inter-nodule distance when the wall is in the longitudinally contracted position of between about 20 and about 30 microns.
- 25 5. The prosthesis of claim 2 wherein the layer of expanded polytetrafluoroethylene has (ii) an average longitudinal inter-nodule distance when the wall is in the longitudinally expanded position of between about 60 and about 140 microns.
- 30 6. The prosthesis of claim 5 wherein the layer of expanded polytetrafluoroethylene has (ii) an average longitudinal inter-nodule distance when the wall is in the longitudinally expanded position of between about 80 and about 120 microns.

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7. An expandable prosthesis comprising:

(a) a discontinuous wall defining a lumen adapted to assume a radially contracted position and a radially expanded position; and

(b) at least one tubular layer of an expanded polytetrafluoroethylene having a first average circumferential inter-nodule distance in a free state, the layer of polytetrafluoroethylene affixed to the wall such that it has a second average circumferential inter-nodule distance when the wall is in the radially contracted state, the second average circumferential inter-nodule distance being less than the first average circumferential inter-nodule distance.

8. The prosthesis of claim 7 wherein the tubular layer of expanded polytetrafluoroethylene has (i) an average circumferential inter-nodule distance of between about 0 and about 75 microns when the wall is in the radially contracted position, and (ii) an average circumferential inter-nodule distance of between about 75 and about 150 microns when the wall is in the radially expanded position.

9. The prosthesis of claim 8 wherein the tubular layer of expanded polytetrafluoroethylene has (i) an average circumferential inter-nodule distance of between about 5 and about 70 microns when the wall is in the radially contracted position.

10. The prosthesis of claim 9 wherein the tubular layer of expanded polytetrafluoroethylene has (i) an average circumferential inter-nodule distance of between about 20 and about 50 microns when the wall is in the radially contracted position.

11. The prosthesis of claim 8 wherein the tubular layer of expanded polytetrafluoroethylene has (ii) an average circumferential inter-nodule distance of between about 80 and about 140 microns when the wall is in the radially expanded position.

12. The prosthesis of claim 11 wherein the tubular layer of expanded polytetrafluoroethylene has (ii) an average circumferential inter-nodule distance of between about 80 and about 120 microns when the wall is in the radially expanded position.

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13. An expandable prosthesis comprising:

(a) a discontinuous wall generally defining a lumen adapted to assume a longitudinally expanded position and a longitudinally contracted position; and

5 (b) at least one layer of expanded polytetrafluoroethylene having a first average longitudinal inter-nodule distance in a free state, the layer of polytetrafluoroethylene affixed to the wall such that the polytetrafluoroethylene has a second average longitudinal inter-nodule distance between 0 and 99 percent of the first average longitudinal inter-nodule distance when the wall is in the
10 longitudinally contracted position.

14. The prosthesis of claim 13 wherein the second average longitudinal inter-nodule distance is between about 20 and about 50 percent of the first average longitudinal inter-nodule distance when the wall is in the longitudinally contracted position.

15. An expandable prosthesis comprising:

(a) a discontinuous wall generally defining a lumen adapted to assume a radially expanded position and a radially contracted position; and

(b) at least one layer of expanded polytetrafluoroethylene having a first average circumferential inter-nodule distance in a free state, the layer
20 of polytetrafluoroethylene affixed to the wall such that the polytetrafluoroethylene has a second average circumferential inter-nodule distance less than about 50 percent of the first average circumferential inter-nodule distance when the wall is in the radially contracted position.

25 16. The prosthesis of claim 15 wherein the second average circumferential inter-nodule distance is less than about 25 percent of the first average circumferential inter-nodule distance when the wall is in the radially contracted position.

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17. An expandable prosthesis comprising:

(a) a discontinuous wall defining a lumen adapted to assume a radially expanded position and a radially contracted position; and

(b) at least one layer of expanded polytetrafluoroethylene having a first average longitudinal inter-nodule distance and a first average circumferential inter-nodule distance in a free state, the layer of the polytetrafluoroethylene affixed to the wall such that the polytetrafluoroethylene has a second average longitudinal inter-nodule distance between 0 and 99 percent of the first average longitudinal inter-nodule distance when the wall is in the radially expanded position and a second average circumferential inter-nodule distance less than about 50 percent of the first average circumferential inter-nodule distance when the wall is in the radially contracted position.

18. The prosthesis of claim 17 wherein the second average longitudinal inter-nodule distance is between about 20 and about 50 percent of the first average longitudinal inter-nodule distance, and the second average circumferential inter-nodule distance is less than about 25 percent of the first average circumferential inter-nodule distance.

19. An expandable stent-graft comprising:

(a) a braided self-expanding stent characterized by a longitudinal shortening upon radial expansion from a first longitudinal stent length to a second longitudinal stent length; and

(b) at least one tubular layer of biaxially oriented expanded polytetrafluoroethylene comprising nodules and fibrils affixed to the stent characterized by a shortening of average longitudinal inter-nodule distance upon radial expansion from a first average longitudinal inter-nodule distance to a second average longitudinal inter-nodule distance;

wherein the ratio of first longitudinal stent length to second longitudinal stent length is within about 25 percent of the ratio of first average longitudinal inter-nodule distance to a second average inter-nodule distance.

20. An expandable stent-graft comprising:

(a) a braided self-expanding stent characterized by a longitudinal shortening upon radial expansion;

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(b) at least one layer of uniaxially oriented expanded polytetrafluoroethylene affixed to the stent, the polytetrafluoroethylene characterized by having substantially no nodules.

21. A method of making an expandable prosthesis comprising:

5 (a) providing a self-expanding braided stent having a longitudinal orientation in an at least partially radially expanded state;

(b) providing at least one layer of expanded polytetrafluoroethylene having a longitudinal orientation and a first average longitudinal inter-nodule distance in a free state;

10 (c) longitudinally compressing the layer of expanded polytetrafluoroethylene so that the resulting longitudinally compressed layer has a second average longitudinal inter-nodule distance which is less than the first average longitudinal inter-nodule distance; and

15 (d) affixing the longitudinally compressed layer of expanded polytetrafluoroethylene to the self-expanding braided stent in the at least partially radially expanded state such that the longitudinal orientations of the stent and layer of expanded polytetrafluoroethylene substantially correspond with one another.

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